CROCKER

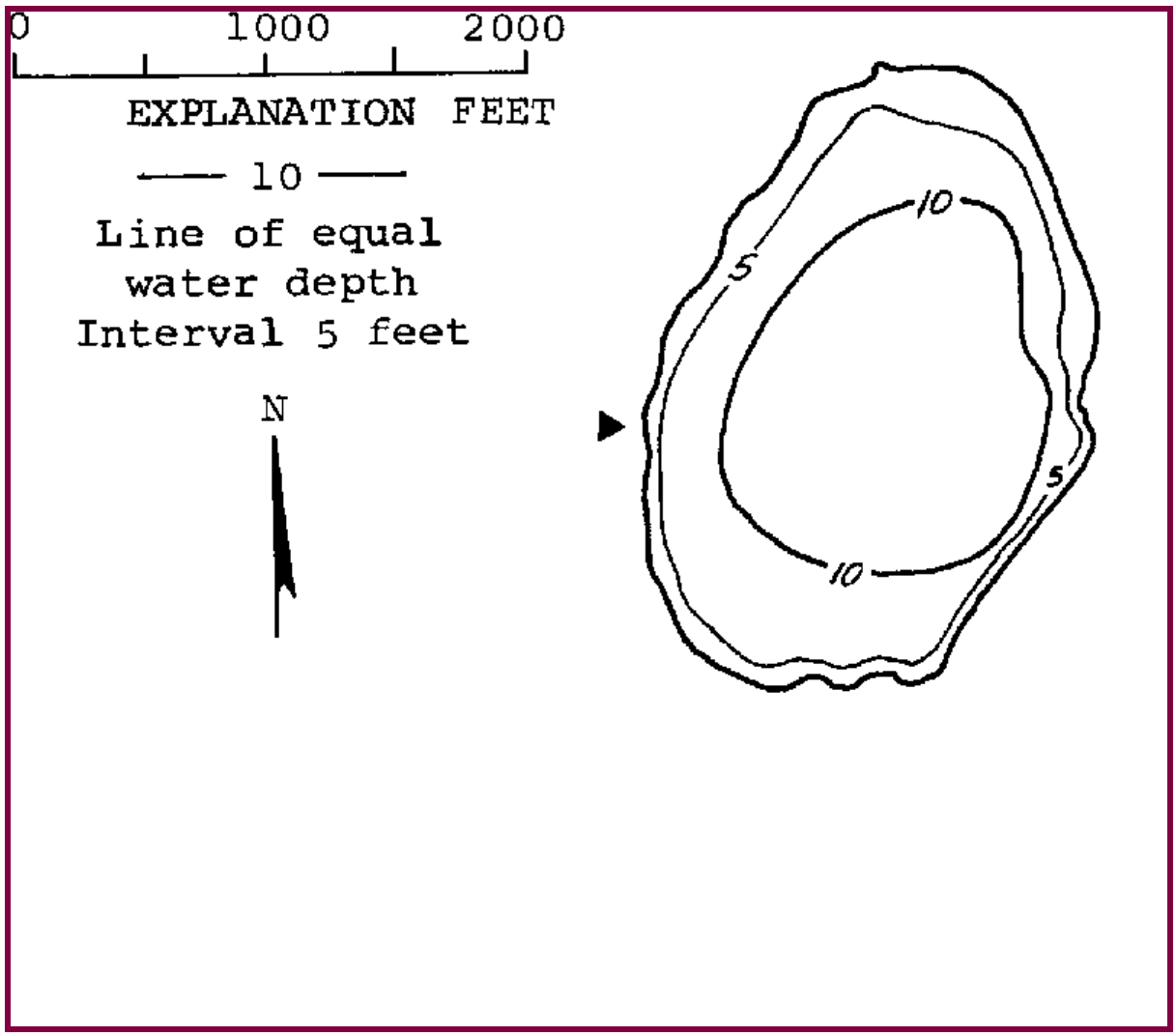
JEFFERSON County

Lake ID: CROJE1

Ecoregion: 2

Crocker Lake is one of the most visible lakes on the Olympic Penninsula for those driving from the Seattle suburbs to Port Angeles along Highway 104. The lake is easily seen from the highway as you're heading west just before the intersection with Highway 101. This small eutrophic lake is abundant with natural aquatic vegetation yet, as of 1998, Crocker Lake lacks the invasive Egeria densa (Brazilian elodea) of its neighbor lake, Lake Leland.

Area (acres)	*Maximum Depth (ft)*	*Mean Depth (ft)*	*Drainage (sq mi)*	
76	13	9	3	
Volume (ac-ft)	***Shoreline (miles)***	***Altitude (ft abv msl)***	***Latitude***	***Longitude***
663	1.29	190	47 56 22.	122 52 45.



Station Information

CROJE1

Primary Station Station # 1 latitude: 47 56 03.9 longitude: 122 53 01.7

Description: Deep part of lake, mid lake directly east of boat launch

Trophic State Assessment for 1998

CROCKER

Analyst: KIRK SMITH

TSI_Secchi:	54	N
TSI_Phos:	66	
TSI_Chl:	58	J
Narrative TSI:[a]	E	

Crocker is a shallow lake with abundant nutrients and macrophyte growth. It is a typical naturally eutrophic lake. The watershed is largely undisturbed with some agriculture and tree cutting in the area. The water quality appears to support both the human and non-human uses in the lake. Zooplankton were quite large, which can be indicative of a large fish predator base. In fact, Crocker was treated on 8 July 1998 with rotenone by the Washington Department of Fish and Wildlife to remove illegally stocked northern pike. High late summer TP could be from nutrient release from anoxic sediments (although the lake was not thermally stratified at the time of sampling, there was an oxycline most months) or possibly from decomposing fish, left in the lake after the rotenone treatment. The lake may have been phosphorous limited during the first half of the summer, becoming nitrogen limited later as phosphorus concentrations rose. However, the very dark colored water may also diminish light penetration into the water column thereby limiting primary production. One fecal sample, collected near the boat launch in August, was unusually high for lakes (140 colonies/100mL).

In our judgement, uses are being supported and the eutrophic state of the lake is natural. We recommend that a total phosphorus criterion be established at 73 ug/L, the seasonal mean of our 1998 samples with an adjustment to account for inter-annual variability (mean of 58 ug/L total phosphorus plus std. dev. of 15 ug/L). However, because of the rotenone treatment our mean could be biased high, and this should be considered an interim criterion pending further TP sampling.

[a] E=eutrophic, ME=mesoeutrophic, M=mesotrophic, OM=oligomesotrophic, O=oligotrophic

Chemistry Data

CROCKER

Date	Time	Strata	Tot P (ug/L)	Tot N (mg/L)	TN:TP	Chloro-phyll (ug/L)	Fecal Col. Bacteria (#/100mL)	Hardness (mg/L)	Calcium (ug/L)	Turbidity (NTU)
Station 0										
8/12/1998		L					140			
Station 1										
6/5/1998		E	18.4	.397	22	10.3		25	5820	3 J

7/30/1998	E	50.3	1.1	22	42.8		
8/12/1998	E	60.6	.854	14	21.8		3.9
9/14/1998	E	103	.755	7	3.9 J		3.1 J

Strata: L=lake surface, E=epilimnion, H=hypolimnion; Qualifier: J=Estimate, U=Less than

Watershed Survey

CROCKER

Survey Date: 9/14/1998

Land Uses (1 = Primary, 2 = Secondary, etc.)

2	**Agriculture(commercial, not hobby)**		**Residential**
	Commercial, Industrial	1	**Park, forest or natural**
3	**Major transportation**		

Impervious surfaces (Roads and parking area): No Curbs

Observations (check mark denotes presence)

BMP's ☑

Select cutting at a near-by forest.

Odors ☑

Yes, a farm one-mile from lake with a strong manure odor.

Cattle ☐ **Ducks** ☐ **Geese** ☑

3 domestic geese by the boat ramp

Fertilizers and weed killers appear to be used in residential or agriculture area ☐

Buffer zones around streams and wetlands ☑

Irrigation ☐

Survey Id: 70

Habitat Survey Summary Report

CROCKER

Data are averages of ***10*** **Stations Surveyed** **Date of Visit:** 9/3/1998

Vegetation Type (Avg. only of sites w/ vegetation present; 1=coniferous, 3=deciduous)

Canopy Layer Avg:	3.0	**Number of stations with canopy:**	4
Understory Avg:	2.9	**Number of stations with understory:**	7

Percent Areal Coverage (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

Canopy Layer:	**trees > 0.3 m DBH**	0.5

	trees< 0.3 m DBH	1.0
Understory:	**woody shrubs saplings**	1.9
	tall herbs, forbs grasses	2.7
Ground Cover:	**woody shrubs seedlings**	1.0
	herbs, forbs, grasses	1.3
	standing water or inundated veg	1.0
	barren or buildings	0.3
Substrate Type (within shoreline plot):	**bedrock**	0.0
	boulders	0.0
	cobble/gravel	0.2
	loose sand	0.5
	other fine soil/sediment	0.3
	vegetated	3.6
	other	0.5
Bank Features:	**angle (O:<30; 1: 30-75; 2:nr vertical)**	0.0
	vertical dist (M from wtrln to high wt):	0.3
	horiz. dist. (M from wtrln to high wt):	0.1

Human Influence

(0 = absent, 1 = adjacent to or behind plot, 2 = present within plot)

buildings	0.3
commercial	0.0
park facilities	0.1
docks/boats	0.1
walls, dikes, or revetments	0.0
litter, trash dump, or landfill	0.2
roads or railroad	0.4
row crops	0.0
pasture or hayfield	0.2
orchard	0.0
lawn	0.2
other	0.0

Physical Habitat Characteristics

station depth (at 10 m from shore)	0.9

Bottom Substrate (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)

bedrock	0.0
boulders	0.0
cobble	0.1
gravel	0.4
sand	1.2
silt	2.7
woody debris	0.6

Macrophyte Areal Coverage (0 = absent, 1 = <10%, 2 = 10-40%, 3 = 40-75%, 4 = >75%)	
submergent	3.2
emergent	1.5
floating	1.7
total weed cover	3.6
Do macrophytes extend lakeward (-1 = yes, 0 = no)	-0.8

Fish Cover (0 = absent, 1 = Present but sparse, 2 = moderate to heavy)	
aquatic weeds	1.8
snags	0.6
brush or woody debris	0.4
inundated live trees	0.0
overhanging vegetation	0.2
rock ledges or sharp dropoffs	0.0
boulders	0.0
human structures	0.2

Zooplankton Report

CROJE1

Date 6/5/1998 Station: 1
Sample ID 12

Only large predators present, Northern Pike, so no known planktivores or very few planktivores present; 1 mL analyzed.

Number of organisms measured: 64

Group	Percent
Cladoceran	50.0%
Copepod	50.0%
Other	

Group	Percent
Small < 1mm	25.0%
Large >= 1mm	75.0%
Ratio of large to Small:	3.00
Average size (mm):	1.06

Aquatic Plant Data

CROCKER

Sampler: Parsons, Bell-McKinnon Survey Date: 9/3/1998

Max depth of growth (M): 2

Comments Sunny, wind. Did vegetation survey form for Kirk Smith. Bare sediment in shallows with patchy E. canadensis. Nuphar dying back. The lake was treated with rotenone to remove Pike several weeks ago. Water very muddy brown. Emergent stems of the Sagittaria rigida grazed off through much of the lake. Many ducks, newt.

SPECIES LIST

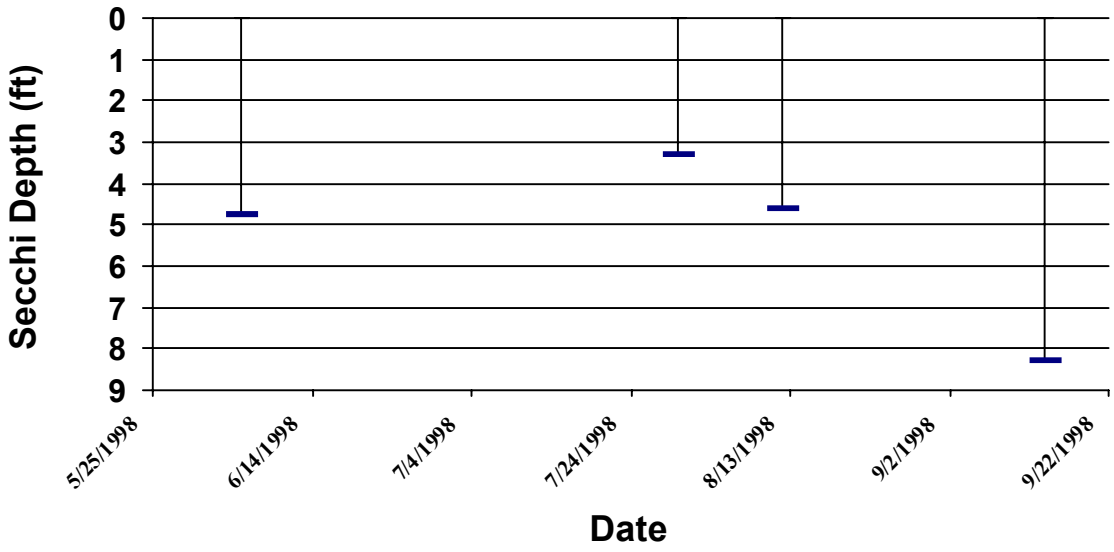
Scientific Name	Common Name	Dist [a]	Comments
Ceratophyllum demersum	Coontail; hornwort	2	
Chara sp.	muskwort	2	
Elodea canadensis	common elodea	4	very dense in shallows
Najas flexilis	common naiad	2	
Nuphar polysepala	spatter-dock, yellow water-lily	3	

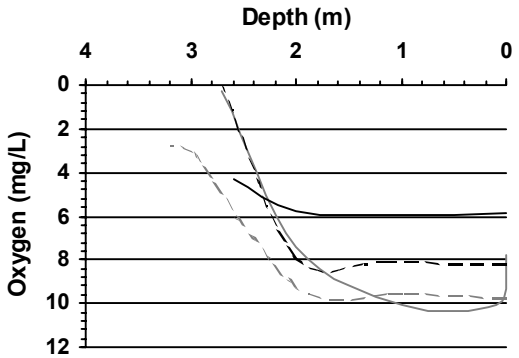
Potamogeton obtusifolius	bluntleaf pondweed	1	on east side
Potamogeton praelongus	whitestem pondweed	2	
Potamogeton pusillus	slender pondweed	1	at north end
Sagittaria rigida	bur arrowhead	2	mostly at south end
Scirpus sp.	bulrush	2	
Typha latifolia	common cat-tail	2	
Utricularia sp.	bladderwort	1	

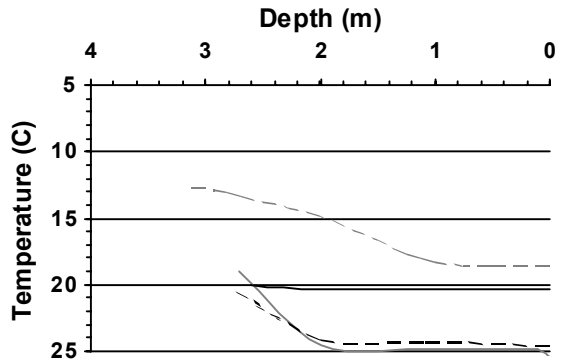
[a] 0 - value not recorded (plant may not be submersed)
1 - few plants in only 1 or a few locations
2 - few plants, but with a wide patchy distribution
3 - plants in large patches, codominant with other plants
4 - plants in nearly monospecific patches, dominant
5 - thick growth covering substrate to exclusion of other species

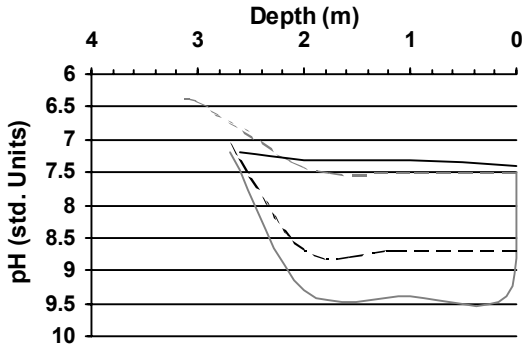
Secchi Depth and Profile Graphics

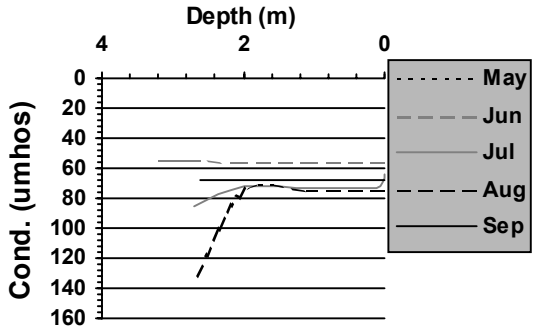
Station: 1 CROJE1











Secchi Data and Field Observations

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Date	Time	Temp-erature (F)	Secchi (ft)	Color (1-greens, 11-browns	Bright-ness (pct)	Wind (1-none, 5-gusty)	Rainfall (0-none, 5-heavy)	Aesthetics (1-bad, 5-good)	Swimming (1-poor, 5-good)	Geese (#)	Waterfowl (besides geese #)	Boats-Fishing (#)	Boats-Skiing (#)
Station 1													
6/5/1998			4.75	8	100			5	2	23	5	1	0
	Sampler: SMITH			Remarks: 3 METERS FOR ZOOPLANKTON TOW.									
7/30/1998			3.3	7	100	2		3	2	9	18	0	0
	Sampler: SMITH			Remarks: WATER WAS POISONED WITH ROTENONE ON 7/8/98. MUCH LOGGING AND CLEAR-CUTTING IN THE AREA. FEW RESIDENTIAL HOMES.									
8/12/1998			4.62	8	0	2		2	2	3	33	0	0
	Sampler: SMITH			Remarks: FIELD VISIT									
9/14/1998			8.25	9	0			4	3	38	23	0	0
	Sampler: SMITH			Remarks: NEW BOAT LAUNCH INSTALLED. The Conductivity and Oxygen results are qualified as an estimate due to postcalibration failing QA/QC requirements.									